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ABSTRACT

The use of media in persuasive messages was investigated in five studies addressing: (1) the effectiveness of realistic media in such messages; (2) interaction of field dependence/independence or hemisphericity with media type in persuasive message delivery; and (3) whether mediated messages should be designed differently for learners with different learning styles. Media for delivering treatments were one or more of either motion pictures, videotape copies of motion pictures, or color slide versions of motion pictures. Dependent variables were attitude toward either soil conservation, smoking, or disabled persons. It was found that realistic media, particularly motion pictures, are somewhat better at changing attitudes than non-realistic media; there is a relationship between field independence and persuasive messages presented by film; attitudes can be modified by using persuasive messages delivered by media; and some types of media may be more effective than others at delivering information designed to change attitudes. Further investigation into the relationship between persuasive messages, delivery media, and learning styles of the target audience is suggested. Twenty-eight references are listed. (LMM)

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TITLE: PERSUASION: FIVE STUDIES DEALING WITH THE RELATIONSHIPS BETWEEN MEDIA, ATTITUDES, AND LEARNING STYLE

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PERSUASION: FIVE STUDIES DEALING WITH THE RELATIONSHIPS BETWEEN MEDIA, ATTITUDES AND LEARNING STYLE

Attitudes are predispositons to respond (Zimbardo and Ebbesen 1970). In other words, attitude helps shape subsequent behavior. Since attitudes are relatively stable and enduring, but still subject to persuasion, they are important to educators because many believe that they have some impact on learning.

Fleming and Levie (1978) make a convincing argument for why educators should be concerned with attitudes and their modification. First, it is apparent that educators do attempt to convince others of the importance of certain ideas, such as attitudes related to social issues like the treatment of minority groups. Attitudes also affect the way people attend to ideas and events. People pay attention to what they enjoy, and tend to ignore or misinterpret what they dislike. It is also likely that information is retained more easily when it is consistent with attitude positions, and is more difficult to remember when it is counter attitudinal. A final reason attitudes and their formation are important to educators is so that biasing messages can be identified and modified either during the design process or during instruction (Fleming and Levie, 1978).

As early as 1931, Thurstone was able to demonstrate the impact of a single filmed message on the attitudes of children. Using a pretest, posttest design, Thurstone found that children's attitudes toward China

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and Chinese culture could be modified either positively or negatively, depending on the intent of a motion picture they watched. Other researchers have found generally similar results. For example, Levonian (1961) used an audience assessment to tailor the content of a film about India. Attitudes of viewers of the motion picture were changed significantly.

Simonson (1979) summarized the results of over two hundred research studies that investigated attitude change and found the literature seemed to indicate that persuasive messages were often successful when instructional media such as films, videotapes, slides and filmstrips were used to deliver them. However, it was also reported by Simonson that media/Attitude research was somewhat suspect.

Several reasons were given for questioning the results of research on media and attitudes. First, the attitude construct investigated in many of the studies Simonson reviewed was often not clearly defined. As a dependent variable used to test hypotheses, the attitude topic was rarely explained as fully as were achievement variables. A second concern was the inadequacy of tests used to measure attitudinal outcomes. Over fifty percent of the time, Simonson found that there was no descriptive information reported about the measure of the attitude dependent variable. Finally, many of the studies used poor experimental designs. Often, attitude measurement did not seem to be the primary concern of the researcher. Rather, attitude testing was often a post-hoc analysis of peripheral importance to the main purposes and design of the study.

In spite of these problems, there seemed to be some common characteristics of successful persuasive instructional messages that if included in their planning, production, or utilization would contribute to attitude change. As a result of this review, Simonson (1984) proposed six guidelines for using instructional media to change attitudes.

Recently, however, a number of questions concerning the impact of instructional media have been made. One of the most interesting summaries of instructional media research was presented by Clark (1983). As a basic theme for this review, Clark stated "The best current evidence is that media are mere vehicles that deliver instruction but do not influence student achievement any more that the truck that delivers our groceries causes changes in nutrition." (Clark, 1983, 445) Clark also stated that the results of reviews of media research published in the last several years seem to be unambiguous and unanimous in finding that any research results that reported a relationship between media and achievement were probably confounded. This confounding was usually caused by either instructional method or content differences between treatments, or a novelty effect for the newer media.

It is important to note that Clark reported on research summaries with achievement as the dependent variable. In other words, it seems to be Clark's opinion, based on literature reviews, that media do not influence achievement, and that one medium is not superior to another

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in producing more positive learning outcomes. However, Clark did not discuss attitudes. The results of media research summarized by Clark were not studies with persuasion as the primary goal. While it might be convenient to assume that similar conclusions could be made for the impact of mediated messages on a student's attitudes, or even psychomotor skills, the summaries of research reported by Clark do not satisfactorily document this position. As a matter of fact, there is some evidence that there is a hierarchy of preferred media types when attitudinal outcomes are of primary importance (Simonson, 1980; Wager, 1975), and that the media type used to deliver persuasive messages is related to the impact of those messages.

PURPOSE

The purpose of this paper will be to report the results of five studies that attempted to answer the following questions.

1. Is there a hierarchy of media types related to effectiveness at delivering persuasive messages? In other words, are media that are able to deliver messages realistically, as defined by Dale (1946), more effective than media that depict messages less realistically?

2. Is there a learner aptitude interaction with media type when attitude change is the goal of instruction. In other words, do the learner characteristics of Field Dependence/Field Independence, and Hemisphericity interact with media type when persuasive messages are delivered?

3. Is it necessary to design mediated messages differently for learners with different learning styles when persuasion is desired? In other words, are media uniformly effective for all learners, or are there different "best" designed media for different groupings of students?

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VARIABLES DEFINED:

The five studies reported below all examined the impact of persuasive messages. There were three media used in one or more of the studies to deliver treatments. They were motion pictures, videotape copies of motion pictures, or 2 x 2 color slide versions of motion pictures. There were two cognitive styles included as independent variables (Ausburn and Ausburn, 1978). They were Field Dependence/Independence, or Hemisphericity. The content of experimental treatments, and the focus of tests of dependent variables were either attitude toward soil conservation, attitude toward smoking, or attitude toward disabled persons.

INDEPENDENT VARIABLES DEFINED:

> FIELD DEPENDENCE/INDEPENDENCE(FD/FI): FD and FI are considered to be pervasive, stable cognitive styles that influence a person's perception of messages (McLeod et al., 1978). FD learners are those who are influenced more by their environment than are FI learners who are more influenced by internal forces. FD individuals seek to be more socially oriented, and are more affected by praise and criticism from their peers. FD tend to take a more passive, spectator role in learning than do FI learners (Farrell, 1971). FI learners, on the other hand, seem more adept at taking a message apart and at understanding its component parts. FI persons tend to be more active learners who often have a strong self concept.
>
> People are not totally Field Dependent or Independent. Rather, they have tendencies one way or the other. For the purposes of the studies reported below, the Group Embedded Figures Test (GEFT; Witkin et al., 1971) was used to identify a person's learning style. Subjects for study were given the GEFT in a standardized testing

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environment, then were categorized as being either FD or FI, depending on their score on the GEFT. Since this test provides a score from zero to eighteen, subjects were assigned randomly to treatments by ordering them from lowest score to highest and by using a table of random numbers to place them in treatment groups. Students who had scores within one score of the average of all scores were not included in treatments. They were excused from the experiments because the GEFT did not satisfactorily identify them as being either FD or FI (Witkin et al, 1971).

HEMISPHERICITY: Researchers have reported that in spite of a great deal of overlap of function, the two hemispheres of the brain organize and encode information to two different ways (Sperry, 1977; Bogan, 1976). Generally, the left hemisphere is more logical, convergent, and analytical. It is responsible for language and processes information sequentially. The right hemisphere is more holistic, intuitive, spatial, and divergent (Ornstein, 1977). The left hemisphere seems to perceive relationships across time, while the right hemisphere specializes in data that is significant across space (Nebes, 1977).

It has also been determined that individuals tend to have a dominant hemisphere. That is, one hemisphere tends to take priority when information is processed. It has been proposed that this hemispheric dominance is related to effective learning. In other words, how a person perceives data in part determines how much is learned.

In order to assign subjects to treatments, the Conjugate Lateral Eye Movement (CLEM) Test was used to identify a person's dominant hemisphere (Day, 1964). The CLEM is an individually administered test that requires observations of a subject's eye movement after reflective questions are asked of them. The movement of the eyes in this kind of a situation is related to hemispheric dominance. The CLEM Test has a reliability of .78 (r=.78; Baken and Strayer, 1973).

Subjects in Study #5 were tested using the CLEM and were assigned to treatment groups. Individuals who did not have a clearly dominant hemisphere as indicated by the CLEM were excused from the experiment.

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DEPENDENT VARIABLES:

Three dependent variables were used to examine research questions. Three studies were concerned with students' attitudes toward soil conservation. One study examined attitudes toward smoking, and one study investigated attitudes toward disabled persons.

1. The "Soil Conservation Attitude Test" (SCAT) was developed by Cook (1979), and revised by Kloock (1981). It contained twenty four statements that subjects reacted to using a five response likert-type scale. The SCAT was reported to have a reliability estimate of .85 (r=.85; Kloock, 1981)

2. The "Smoking Attitude Scale" (SAS) was a twenty-one item measure with a five response likert-type scale. The SAS had a reliability estimate of .85 (r=.85; Baer, 1966).

3. The "Attitudes Toward Disabled Persons" (ATDP) test was a twenty statement measure with a six level likert-type scale. The ATDP had a reliability estimate of .76 (r=.76; Yucker et al., 1970).

METHODOLOGY:

The design of each of the five studies will be discussed next. The specific utilization of the dependent and independent variable defined above will also be explained.

Study #1: In many respects, this study could be considered a pilot because treatments and the measure of the dependent variable were used experimentally for the first time. However, the experimental design, the treatments, and the measure of the dependent variable were considered to be of high enough quality to allow this study to be considered a rigorous one.

There were four treatments. Three were experimental and one was a

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control. The three experimental treatments were based on a twenty-three minute persuasive film titled, "We Are of the Soil". It was designed to introduce soil conservation practices such as conservation tillage to the audience, and to convince them that these practices were critical ones.

Subjects in the first treatment viewed this motion picture. Students in the second treatment watched a 2x2 slide with accompanying audio tape that was produced from the motion picture. Each scene in the film was analyzed and the key still picture was copied and made into a slide. The film's narration was copied onto an audio tape. When students viewed the slides they were projected using a dissolve unit and two carousel slide projectors.

Students in the third experimental treatment only listened to the motion picture's narration. They did not view anything, but sat in a darkened room.

This study used a pretest, posttest control group design (Campbell and Stanley, 1963; Design #4). Subjects were high school students in a medium sized city in the midwest. First, subjects were administered the SCAI to determine their attitude toward soil conservation, then subjects were randomly assigned to one of the three experimental treatments, or to the control group. Treatments were administered approximately one week after the pretest. After treatments were viewed, subjects were again administered the SCAI. The change in score from pretest to posttest for each student was

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combined with others and used to test hypotheses.

Subjects also rated the technical quality of the treatments. Ratings were high and generally equal. The group that only listened to the narration rated their experience the lowest (3.51 on a scale of 1-5 with 5 = excellent), but this rating was not significantly different than those of the other two experimental groups.

Study #2: This study was a modified replication of Study #1. There were several changes. First, the design was a post-test only control group (Campbell and Stanley, 1963; Design #6). Subjects, who in this study were college undergraduates, were randomly assigned to treatments. SCAT scores were compared to the control group in order to test hypotheses. The pre-test was omitted because it was felt this would minimize the influence of testing bias. Also, the audio only treatment was dropped from the experimental design. The three treatment groups were the group that watched the motion picture, the group that watched the slide with audio tape, and the control group. Additionally, the SCAT, the measure of the dependent variable, was modified slightly for this study based on the results of Study #1. Its reliability was .85 (r=.85).

The most significant change from Study #1 was the inclusion of the independent variable, Field Dependence/Independence. Subjects were given the GEFT (Witkin et al., 1971) before assignment to

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treatment groups. GEFT scores were rank ordered from lowest (a score of one) to highest (an eighteen). Subjects who obtained scores within one point of the mean of all scores were eliminated from the experiment because the GEFT did not satisfactorily categorize them as being either Field Dependent or Field Independent. Assignment of subjects to treatment groups was then completed by placing the subject with the lowest score in the film treatment, the next student in the slide with audiotape treatment and the next student in the control group. This procedure was followed until all subjects were assigned to one of the three treatments.

Study #3: This study was a modified replication of Study #2. There were three changes. First, the topic of the experimental treatments was changed. A film titled "The Right Approach" was selected by a jury of media specialists as an excellent persuasive film. Its topic was the employment of the handicapped. A slide with accompanying audio tape was produced from the key visual of each scene of the film in a manner similar to how the slide treatment was produced for Studies #1 and #2. These treatments were judged by experts to be of generally equal quality.

Naturally, since the topic of the treatments changed the test of the dependent variable had to be changed also. A standardized test of attitude toward disabled persons was found in the MENTAL MEASUREMENTS YEARBOOK (Buros, 1978). The "Attitudes Towards

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Disabled Persons" (ATDP) test was used to measure attitude after treatments were administered. The ATDP was reported to have a reliability estimate of .76 (r=.76; Yucker, 1970)

The second change was to use fifth and sixth grade students as subjects. They ranged in age from ten to thirteen. Last, a follow up testing three weeks after treatments was given to a small sub-sample of subjects to determine if attitude changes produced by the treatments persisted.

Thus, the post test only design for this study had two independent variables, Field Dependence and Treatment. The 2 cell by 3 cell design had three treatments (motion picture, slide with audio tape, and control), and two levels of the cognitive style Field Dependence/Independence.

Study #4: This experiment could also be considered a modified replication of Study #2. There were two major changes made to the design of Study #2 for this experiment. First, junior and senior high school students were used as subjects. These students ranged in age from 13 to 18, and attended school in a small town in an agricultural state in the midwest.

The second change was the examination of the independent variable hemisphericity in this study to replace Field Dependence/Independence. Subjects were first tested using the Conjugate Lateral Eye Movement (CLEM) test to determine their

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dominant brain hemisphere. Then they were assigned to one of three treatment groups. The first treatment group viewed the persuasive film "We Are of the Soil". The second group watched the slide with accompanying audio tape version of this motion picture. The last group was a control. After treatments were completed, the SCAT was administered. This study used a two cell by three cell, post test only control group design.

Study #5: This experiment took a slightly different approach than the four Studies discussed above. At its foundation was the principle reported by Simonson (1984), and Rogers (1973), that use of fear may be an effective technique for attitude change especially if preventatives or probabilities of exposure to the fear provoking event are included in the message. In other words, an effective persuasive message that shows the dire consequences of not following some course of action, such as stopping smoking or wearing seat belts, can be made more effective if cures for the problem or techniques for how to change behavior are included in the message.

Study #5 used a two cell by three cell post test only control group design. Field Dependence/Independence was an independent variable, and the college students who participated in this experiment were tested using the GEFT and assigned to one of the three treatment groups just as they were in Study #2.

Experimental treatments were based on a film titled "The Feminine Mistake", a 23 minute long anti-smoking motion picture sponsored by the American Cancer Society. This film was selected by a group of media specialists from a number of others because of its high quality. Permission was obtained from the copyright holder to produce two fifteen minute videotape versions of the film. The first version showed only the fear provoking scenes included in "The Feminine Mistake". Narrated by Bonnie Franklin, star of the television program "One Day At A Time", this version showed scenes designed to scare viewers out of smoking. These scenes included an interview of a young woman undergoing chemotherapy for lung cancer, sequences showing how smoke deteriorates the tissues of the skin, and a presentation by a doctor of the results of medical tests that demonstrated the effects of cigarette smoke on unborn children.

The second fifteen minute videotape version included the most dramatic, fear provoking scenes used in the first version, but also included about five minutes of information on how to stop smoking. These scenes gave information on smoker's support groups, and how the body recovers once a smoker quits.

The two versions of the motion picture were evaluated several times during production. They were also evaluated by subjects during the experiment and in all cases were judged to be of generally high and equal quality.

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After treatments were administered, subjects completed the Smoking Attitude Scale (SAS; Baer, 1966). The SAS was reported to have a reliability estimate of .84 (r=.84).

RESULTS: The results of each of the five studies will be presented in turn, then the implications of these results will be discussed.

Study #1: Descriptive statistics are reported in Table #1. While some changes in attitude occurred, there were no statistically significant results found. Of interest was the large dispersion of scores around the mean. In other words, the treatments did not influence students uniformly. Some students were affected considerably, and some were not influenced at all.

In retrospect, it was decided that the use of a pretest was probably not a good idea. Campbell and Stanley (1963) recommended the posttest only, control group design (Design #6) when random assignment of subjects to treatments was possible. Studies #2 - #5 used Design #6.

Table #1 Here

Study #2: Descriptive and inferential statistics for Study #2 are reported in Table #2. There was a statistically significant attitude difference reported that was attributable to the treatments. The average scores of students in all four experimental treatment cells were more positive towards the importance of soil conservation than were the scores of control subjects. A Duncan's test (Ferguson, 1971) was used to identify where significant differences occurred within the design, and it was found that the subjects in the motion picture treatment who were identified as being Field Independent had more positive attitudes than did subjects in any of the other five treatment groupings.

Table #2 Here

Study #3: Results of descriptive and inferential statistical tests are reported in Tables #3A, and #3B. There was a statistically significant difference in attitude attributable to treatments and to the learner cognitive style Field Dependence/Independence. After treatments the subjects who viewed the motion picture generally had more positive attitudes toward disabled persons than did subjects who watched the slide with audio presentation. Average attitude scores of subjects in one of the two experimental

treatments were significantly more positive than were the average scores of control subjects.

Average scores of several treatment cells deserve note. First, control subjects who were Field Independent were generally more positive towards disabled persons than were Field Dependent control subjects. Next, three of the treatment cells (Film/FD, Film/FI, and Slide/FI) had approximately equal attitude scores, while the fourth treatment group, the Field Dependent students who viewed the slide presentation, had significantly less positive attitudes toward the disabled than did any of the other experimental groups. It appeared that there was an interaction between Field Dependence and Treatment.

This study added a dimension not included in the other experiments. Three weeks after treatments were administered, fifty nine of the subjects were randomly selected for retesting. The results of that retesting are reported in Table #38. There were no significant differences found, even though the trends of scores were similar to those obtained from the original administration of the attitude test, ATDP. There seemed to be a regression to the mean effect taking place (Campbell and Stanley, 1963). It was also apparent that Field Independent subjects generally were more positive towards disabled persons than were Field Dependent subjects. Because such small numbers of subject were included in this retesting it is impossible to draw generalizable conclusions from the data. Certainly, additional

research with full scale retesting of subjects is necessary.

Table 3A Here

Table 3B Here

Study #4: Results of tests to provide descriptive statistics are reported in Table #4. There were no statistically significant differences found, although the trends of the mean scores were interesting. Left brain dominant subjects were generally more positive than were right brain subjects in all treatment categories.

In order to examine the data more completely, an analysis of SCAT scores for subjects in grades 9 through 12 was conducted. While results were not significant, it was found that subjects in the higher grades who were in experimental treatments had more positive attitudes when their scores were compared to control subjects in the same grade. In other words, the difference between control group subjects' and experimental group subjects' attitude scores were greater in the higher grades than they were in the lower grades.

Table #4 Here

Study #5: Results of descriptive and inferential tests are reported in Table #5. It was found that both experimental treatments were successful at significantly influencing subjects' attitudes toward smoking. In other words, subjects in both versions of the videotaped adaptations of "The Feminine Mistake" had more negative attitudes towards smoking after viewing treatments than did control subjects.

While the scores obtained from subjects who viewed the two experimental treatments were not significantly different from one another, the trends of scores did support the assumption that fear provoking messages that also included remedies for the problem discussed in the message would be more persuasive than would be those that only presented unpleasant information. There was no statistical difference reported between the levels of the independent variable Field Dependence/Independence, nor was there a significant interaction between Field Dependence and Treatment.

DISCUSSION:

This discussion of the results of these five studies will be segmented into three parts. First, the three experimental questions proposed above about the relationship between attitude change, media, and learning style will be examined. Next, additional research needed in this area will be identified, and last, a summary of the significance of these studies will be presented.

Research Questions:

Earlier, three specific questions were posed that served as guides for design of the five studies. The relationship between the results of the five studies to these research questions will be discussed.

> Question #1. Is there a hierarchy of media types related to effectiveness at delivering persuasive instructional messages?

First, it must be stated that no experiment "proves" anything. Results must be interpreted in light of limitations of the design of the study. Even when the general structure of an experiment is replicated several times as was attempted here, it is important not to become overconfident that results are generalizable in all instances. Certainly, readers of this report must evaluate it with a healthy skepticism. However, it does seem obvious that media can be used to deliver persuasive messages, and it is also obvious, though to a lesser degree, that media that depict

messages more realistically, such as motion pictures, are somewhat better at changing attitudes than are media that deliver messages less realistically.

The impact of realistic persuasive messages on attitude change has been studied by psychologists for over two decades. Reinforcement Theory is based on the assumption that realistic messages have more cues for the viewer, and thus, are more effective at persuading (Hovland, 1961). The results of these studies seem to support the assumptions of this theory. The persistence of change produced in learners because of participation in experimental treatments is less obvious and in need of additional scientific inquiry.

> #2. Is there a learner aptitude interaction with media type when attitude change is the goal of a message?

Based on the results of Studies #2 and #3, there seems to be a relationship between Field Independence and persuasive messages presented by film. While it may be that films are, in general, better than slide presentations at changing attitudes, this may be because Field Independent learners are influenced considerably more than are Field Dependent viewers. It also seems that for the attitude constructs investigated by these studies, Field Independent persons had more positive attitudes about them to begin with. Evidence for this generalization can only be inferred from the statistical results reported above. Certainly, more study is needed.

#3. Is it necessary to design mediated messages differently for learners with different learning styles when persuasion is desired?

Data related to this research question is the most difficult to infer from the information reported above. While it might be convenient to assume than motion pictures work better for all subjects generally, and best for Field Independent subjects specifically, as Studies #2 and #3 seem to indicate, and that Hemisphericity is not related to attitude change, as the results of Study #5 seems to indicate, these generalizations would be subject to justified skepticism. Other equally interesting, but conflicting interpretations might also be drawn from the data. For example, the results of Study #5 seem to indicate that left brain dominant teenagers tend to be more positive generally toward the need for soil conservation, and that they are influenced more by a slide presentation than they are by a motion picture. While this kind of conclusion might seem logical based on what is known about the sequential, logical manner that left brain dominant persons seem to favor when they process information, the results of Study #5 are not statistically significant and do not allow generalizations of this kind. As is often the case, experimental research presents as many questions as it answers.

Suggestions for Additional Research:

One often stated, and valid criticism of educational research is the failure of investigators to replicate the work of others. Certainly, Studies #2,#3,#4, and #5 should be replicated. Modified

replications, those studies than imitate most but not all of the design parameters of a previous study, are needed also. For example, Study #3, an experiment that used attitude toward disabled persons as its dependent variable, could be replicated using other age groups, and possibly another learning style as an independent variable. Also, Study #5 could be replicated using a different age group, or with the same age group but with a different dependent variable. In other words, a mosaic of many studies dealing with the general research questions posed above are required before global generalizations are made.

Summary of Conclusions:

A fundamental assumption of the research presented above was that attitude change was an important concern of the educator. Since attitudes are predispositions to respond, and because some evidence is now being reported that relates attitudes to behaviors, the modification of attitudes was considered a worthwhile experimental endeavor. Most obvious by its omission from the five research designs discussed in this report was any examination of attitude position to related behavior. In other words, there was no study of subjects' actions after their attitudes were successfully modified. Did soil conservation improve? Did cigarette smoking decrease? Did interaction with disabled persons increase? While there is some evidence in the literature that the modification of attitudes will change subsequent behaviors (Simonson, 1977), these relationships require considerable more study.

It is also important not to overlook what does seem to be supported by the results of the five studies presented in this report. First, attitudes toward educationally relevant topics, such as conservation, smoking, and disabled persons, can be modified by using persuasive messages delivered by media. Next, it appears that some types of media may be more effective than others at delivering information designed to change attitudes. Motion pictures seem the most effective, possibly because the film medium presents information most realistically. There also seems to be sufficient evidence to warrant further investigation into the relationship between persuasive messages, media used to deliver those messages, and the learning styles of the target audience. Clark's comparison of media to delivery trucks may be safe and if not supportable, at least difficult to refute. However, it may not be totally accurate, especially when the products delivered are cartons of attitude rather than crates of achievement.

Table 1. Descriptive Statistics for Study #1

	TREATMENTS				
	Motion Picture	Slides with Audio	Audio Only	Control	TOTAL
N	40	49	43	43	175
$\bar{X}a$	+.37	+1.65	-.08	-.52	+.38
SD	9.31	8.34	8.29	8.73	8.65

$\bar{X}a$ = average change between pre- and post-test (higher positive number indicates positive change toward soil conservation)

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Table 2. Descriptive and Inferential Statistics for Study #2

A. Descriptive statistics

	Treatment			
	Film	Slides	Control	Total
Field dependent subjects	$\bar{X}a$= 64.69 N = 13 SD= 6.76	$\bar{X}$ = 65.33 N = 12 SD = 7.39	$\bar{X}$ = 61.14 N = 14 SD = 8.47	$\bar{X}$ = 63.62 N = 39 SD = 7.64
Field independent subjects	$\bar{X}$ = 69.86 N = 14 SD= 4.85	$\bar{X}$ = 65.31 N = 13 SD= 7.96	$\bar{X}$ = 63.69 N = 16 SD= 7.95	$\bar{X}$ = 66.19 N = 43 SD= 7.42
Total	$\bar{X}$ = 67.37 N = 27 SD= 6.31	$\bar{X}$ = 65.32 N = 25 SD= 7.53	$\bar{X}$ = 62.50 N = 30 SD= 8.16	$\bar{X}$ = 64.96 N = 82 SD= 7.59

B. Multiple analysis of variance

Source	SS	DF	MS	F	Sign. of F
Main effects	482.45	3	160.82	2.98	.04*
Treatment	347.30	2	173.65	3.22	.05*
Field dependence	140.80	1	140.79	2.61	.11
Interaction	87.37	2	43.69	.81	.45
Explained	569.82	5	113.96	2.11	.07
Residual	4097.05	76	53.94		
Total	4666.88	81	57.62		

*p<.05.

$\bar{X}a$ = Higher scores indicate a more positive attitude toward soil conservation.

Table 3A. Descriptive and Inferential Statistics for Study #3

A. Descriptive statistics

	Treatment			
	Film	Slides	Control	Total
Field dependent subjects	$\bar{X}_a$ = 86.08	$\bar{X}$ = 75.25	$\bar{X}$ = 67.83	$\bar{X}$ = 76.64
	N = 25	N = 24	N = 23	N = 72
	SD = 14.61	SD = 18.96	SD = 21.29	SD = 19.65
Field independent subjects	$\bar{X}$ = 85.17	$\bar{X}$ = 87.24	$\bar{X}$ = 78.35	$\bar{X}$ = 83.50
	N = 24	N = 21	N = 23	N = 68
	SD = 17.01	SD = 14.55	SD = 16.38	SD = 16.28
Total	$\bar{X}$ = 85.63	$\bar{X}$ = 80.84	$\bar{X}$ = 73.09	$\bar{X}$ = 79.97
	N = 49	N = 45	N = 46	N = 140
	SD = 15.67	SD = 17.91	SD = 19.52	SD = 18.35

B. Multiple analysis of variance

Source	SS	DF	MS	F	Sign. of F
Main effects	5489.81	3	1829.94	6.11	.001*
Treatment	3843.53	2	1921.77	6.41	.02*
Field dependence	1704.87	1	1704.87	5.69	.002*
Interaction	1188.08	2	594.04	1.98	.14
Explained	6677.88	5	1335.58	4.46	.001*
Residual	40150.01	134	299.63		
Total	46827.89	139	336.89		

*$p < .05$.

$\bar{X}_a$ = Higher scores indicate a more positive attitude toward disabled persons.

Table 3B. Retest Descriptive and Inferential Statistics for Study #3

A. Descriptive statistics

	Treatment			
	Film	Slides	Control	Total
Field dependent subjects	$\bar{X}a$ = 82.00	$\bar{X}$ = 71.25	$\bar{X}$ = 74.45	$\bar{X}$ = 75.96
	N = 9	N = 8	N = 11	N = 28
	SD = 20.54	SD = 22.19	SD = 15.91	SD = 19.14
Field independent subjects	$\bar{X}$ = 78.00	$\bar{X}$ = 89.00	$\bar{X}$ = 86.60	$\bar{X}$ = 84.68
	N = 10	N = 11	N = 10	N = 31
	SD = 23.88	SD = 18.00	SD = 15.13	SD = 19.25
Total	$\bar{X}$ = 79.89	$\bar{X}$ = 81.53	$\bar{X}$ = 80.24	$\bar{X}$ = 80.54
	N = 19	N = 19	N = 21	N = 59
	SD = 21.84	SD = 21.27	SD = 16.38	SD = 19.53

B. Multiple analysis of variance

Source	SS	DF	MS	F	Sign. of F
Main effects	1130.49	3	376.83	1.01	0.40
Treatment	13.59	2	6.79	.018	0.98
Field dependence	1102.19	1	1102.19	2.95	0.09
Interaction	1205.52	2	602.76	1.61	0.21
Explained	2336.02	5	476.20	1.25	0.30
Residual	19790.63	53	373.41		
Total	22126.64	58	381.49		

$\bar{X}a$ = Higher scores indicate a more positive attitude toward disabled persons.

Table 4. Descriptive Statistics for Study #4

	TREATMENT			
	Film	Slides	Controls	TOTAL
Right Brain	$\bar{X}a$=57.26	$\bar{X}$=57.47	$\bar{X}$=55.56	$\bar{X}$=56.81
Dominant	N=19	N=17	N=16	N=52
Learner	SD=8.26	SD=11.35	SD=9.80	SD=9.65
Left Brain	$\bar{X}$=59.78	$\bar{X}$=60.64	$\bar{X}$=57.29	$\bar{X}$=59.02
Dominant	N=18	N=14	N=21	N=53
Learners	SD=11.38	SD=7.58	SD=7.76	SD=9.02
Total	$\bar{X}$=58.49	$\bar{X}$=58.90	$\bar{X}$=56.54	$\bar{X}$=57.92
	N=37	N=31	N=37	N=105
	SD=9.84	SD=9.81	SD=8.54	SD=9.36

$\bar{X}a$ = Higher number indicates a more positive attitude toward soil conservation.

Table 5. Descriptive and Inferential Statistics for Study #5

A. Descriptive statistics

		Treatments		
		Fear alone	Fear with alleviation	Control
Field dependent group	$\bar{X}_a$	38.93[a]	41.23	47.50
	SD	7.78	11.67	6.76
	N	15	22	14
Field independent group	$\bar{X}$	39.85	40.21	48.32
	SD	10.87	8.95	13.16
	N	20	24	22

B. Multiple analysis of variance - treatment by level

Source	D.F.	SS	MS	F	P
Main effects	3	1562.56	520.85	4.810	0.003*
Treatment	2	1554.52	777.26	7.170	0.001*
Level	1	0.35	0.35	0.000	0.960
Interaction	2	24.50	12.25	0.133	0.890
Explained	5	1587.06	317.41	2.930	0.020
Total	116	13614.47			

$\bar{X}_a$ = Higher scores indicate a more positive attitude towards smoking.

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